

REMARKS

Claims 1-7, 9-11 and 13-22 remain in the application. Claims 8 and 12 are hereby canceled without prejudice. Claims 1, 7, 11, 13, 19 and 22 are hereby amended. No new matter is being added.

Specification

Applicant has hereby amended the specification on page 2 and on page 7 to correct the informalities indicated by the Examiner. Applicant respectfully submits that these objections are now overcome.

Claim Objections

Applicant has amended claim 7 to correct the informality indicated by the Examiner. Applicant respectfully submits that this objection is now overcome.

Claim Rejections -- 35 U.S.C. § 101

Claims 1-10 and 22 were rejected under 35 USC 101 as being directed to non-statutory subject matter. Independent claims 1 and 22 are hereby amended. Applicant respectfully submits that the amended claims are now directed to statutory subject matter, and hence that this rejection is now overcome.

In particular, amended claim 1 now recites as follows.

1. **A method of rapidly selecting a physical memory locality to accomplish efficient memory allocation in a multiprocessor system**, the method comprising:
providing a data structure including sets of equidistant physical memory localities; and
selecting a preferred physical memory locality using a pointer to a locality within said data structure,

wherein the pointer is rotated amongst localities within a current equidistant set so as to provide for round-robin type selection amongst those equidistant physical memory localities.

(Emphasis added.)

As seen above, amended claim 1 recites, **“A method of rapidly selecting a physical memory locality to accomplish efficient memory allocation in a multiprocessor system”** In addition, amended claim 1 recites the step of **“selecting a preferred physical memory locality”**

Applicant respectfully submits that amended claim 1 is directed to a statutory process claim. In particular, **amended claim 1 is directed to a method with a practical application in the technological arts, namely the rapid selection of physical memory localities to accomplish efficient memory allocation in a multiprocessor system.** A physical step in amended claim 1 is the step of “selecting a preferred physical memory locality” This step in turn produces the physical and tangible result of “efficient memory allocation in a multiprocessor system.”

Hence, applicant respectfully submits that this rejection is now overcome in relation to amended claim 1. Claims 2-10 depend from claim 1. As such, claims 2-10 also now overcome this rejection.

Claim 22 is amended and now recites, “A multiprocessor computing system configured so as to rapidly select physical memory localities to accomplish efficient memory allocation....” As such, claim 22 is now directed to a computing system (i.e. a computing apparatus). Hence, applicant respectfully submits that this rejection is now overcome in relation to amended claim 22.

Claim Rejections -- 35 U.S.C. § 102

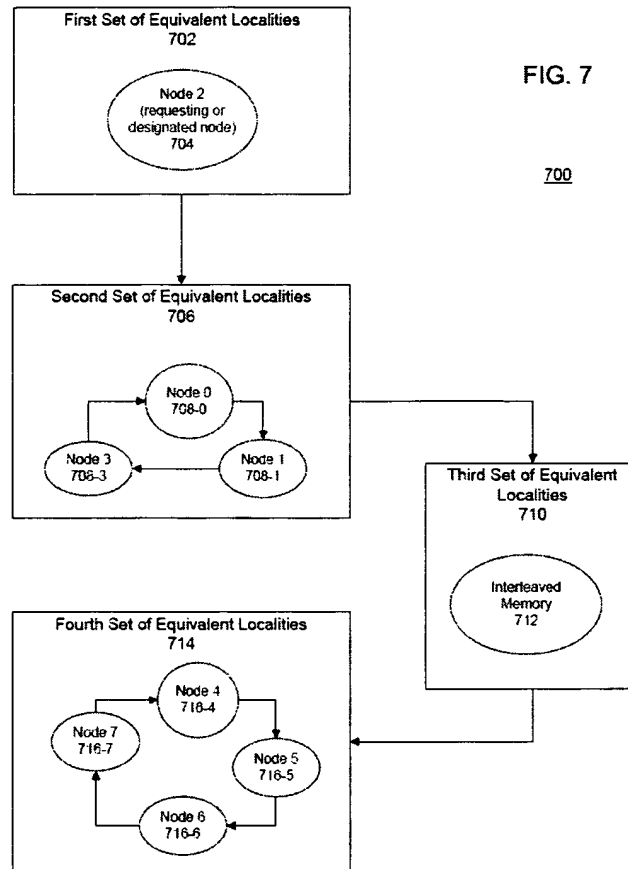
Claims 1-4, 7, 9-11, 13-14, 19 and 21-22 were rejected as being anticipated by Koenen. Applicants respectfully traverse this rejection in relation to the claims as amended.

Claim 1 has been amended and now incorporates the limitation of original claim 8. Claim 1 recites as follows.

1. A method of rapidly selecting a physical memory locality to accomplish efficient memory allocation in a multiprocessor system, the method comprising:
providing a data structure including sets of equidistant physical memory localities; and
selecting a preferred physical memory locality using a pointer to a locality within said data structure,
wherein the pointer is rotated amongst localities within a current equidistant set so as to provide for round-robin type selection amongst those equidistant physical memory localities.

(Emphasis added.)

As shown above, claim 1 requires “providing a data structure including sets of equidistant physical memory localities.” An example of such a data structure with sets of equidistant physical memory localities is shown in FIG. 7 of the present application, which is reproduced below for convenience of reference.



In addition, claim 1 now requires “selecting a preferred physical memory locality using a pointer to a locality within said data structure, wherein the pointer is rotated amongst localities within a current equidistant set so as to provide for round-robin type selection amongst those equidistant physical memory localities.” This claimed aspect is discussed, for example, in the specification on page 14, line 27 through page 15, line 6, which states as follows.

... In accordance with an embodiment of the invention, all the elements in a set are at a same access “distance” in relation to a starting locality. The elements within a set may be arranged in a circular list. The first set in the overall structure holds the fastest localities from which to allocate memory. The next set holds the next fastest localities, and so on. The next element in the set from which to attempt an allocation is indicated by a pointer to that element. **After an element is accessed, the pointer may shift to a next element in the set so as to implement a round-robin type**

allocation policy. With such allocation, equidistant localities are each searched for available memory in a round-robin fashion. Hence, equidistant localities are treated fairly. This advantageously distributes memory accesses evenly across the equidistant localities and makes it unlikely that one locality will run out of memory long before other localities.

(Emphasis added.)

As stated in the above quotation from the specification, the round-robin type selection **“advantageously distributes memory accesses evenly across the equidistant localities and makes it unlikely that one locality will run out of memory long before other localities.”**

Applicant respectfully submits that Koenen does not teach the above-discussed limitations of claim 1.

In particular, regarding the claimed round-robin type selection, the office action cites to Paragraph 0038 of Koenen (this citation is made in relation to original claim 8 which recites the round-robin type selection from a set of equidistant localities). Paragraph 0038 of Koenen recites as follows.

[0038] The affinity algorithm in the scheduler helps only if the memory allocated for the process can somehow be allocated near the CPU from which the request was generated. When the O/S receives a request to create a new process/thread, it first allocates memory space for the code and data from the available pages or old existing pages before it can schedule the process/thread to run. The memory manager examines the tables and coordinates with the scheduler to correlate the assignment of the initial CPU ID with the physical memory pages allocated for that process. During process creation, the kernel allocates memory for the new process and enters the information in the O/S process table. The process is put into a ready-to-run queue and assigned to a processor when one becomes available. In accordance with the present techniques, the kernel examines the physical memory address of the process, determines the memory node ID from Table 3 and looks for an available processor on the same node from Table 2. Slave, child, or worker threads would be assigned to CPUs with close proximity to its master or parent process to benefit from shared memory space. New applications can be allocated memory anywhere within the populated system's memory. The process is put in the ready-to-run queue as usual, as understood by those skilled in the art. A more detailed description of the functionality of the process scheduler will be described with reference to FIG. 2 below.

As seen above, paragraph 0038 of Koenen does not teach or suggest the claimed **round-robin type selection from a set of equidistant localities**.

For at least the above-discussed reasons, applicant respectfully submits that amended claim 1 is now patentably distinguished over Koenen.

Claims 2-4, 7 and 9-10 depend from claim 1. Hence, applicant respectfully submits that claims 2-4, 7 and 9-10 are now also patentably distinguished over Koenen for at least the same reasons as discussed above in relation to claim 1.

Claim 11 is amended in a similar manner as claim 1 in that it also now recites the round-robin type selection from a set of equidistant localities. As such, for at least the same reasons as discussed above in relation to claim 1, claim 11 is now also patentably distinguished over Koenen.

Claims 13-14 depend from claim 11. Hence, applicant respectfully submits that claims 13-14 are now also patentably distinguished over Koenen for at least the same reasons as discussed above in relation to claim 11.

Claim 19 is also amended in a similar manner as claim 1 in that it also now recites the round-robin type selection from a set of equidistant localities. As such, for at least the same reasons as discussed above in relation to claim 1, claim 19 is now also patentably distinguished over Koenen.

Claim 21 is also amended in a similar manner as claim 1 in that it also now recites the round-robin type selection from a set of equidistant localities. As such, for at least the same reasons as discussed above in relation to claim 1, claim 19 is now also patentably distinguished over Koenen.

Claim 22 depends from claim 21. Hence, applicant respectfully submits that claim 22 is now also patentably distinguished over Koenen for at least the same reasons as discussed above in relation to claim 21.

Claim Rejections -- 35 U.S.C. § 103

Claims 5-6, 15-18, and 20 were rejected as being unpatentable over Koenen in view of Horstmann et al. Applicants respectfully traverse this rejection in relation to the claims as amended.

Claims 5-6 depend from claim 1. As such, claims 5-6 now also incorporate the round-robin type selection feature from their parent claim 1. Hence, applicant respectfully submits that claims 5-6 are patentably distinguished over Koenen for at least the same reasons as discussed above in relation to claim 1. Regarding Horstmann et al, that reference is cited as teaching "wherein the physical memory localities further includes interleaved memory in the system (Column 1, lines 57-67). Horstmann et al does not disclose or suggest the claimed round-robin type selection from a set of equidistant localities. Therefore, applicants respectfully submit that claims 5-6 are now patentably distinguished over Koenen in view of Horstmann et al.

Similarly, claims 15-18 depend from claim 11. As such, claims 15-18 now also incorporate the round-robin type selection feature from their parent claim 11. Hence, applicant respectfully submits that claims 15-18 are patentably

distinguished over Koenen for at least the same reasons as discussed above in relation to claim 11. Regarding Horstmann et al, that reference is cited as teaching "wherein the physical memory localities further includes interleaved memory in the system (Column 1, lines 57-67). Horstmann et al does not disclose or suggest the claimed round-robin type selection from a set of equidistant localities. Therefore, applicants respectfully submit that claims 15-18 are now patentably distinguished over Koenen in view of Horstmann et al.

Finally, claim 20 depends from claim 19. As such, claim 20 now also incorporates the round-robin type selection feature from claim 19. Hence, applicant respectfully submits that claim 20 is patentably distinguished over Koenen for at least the same reasons as discussed above in relation to claim 19. Regarding Horstmann et al, that reference is cited as teaching "wherein the physical memory localities further includes interleaved memory in the system (Column 1, lines 57-67). Horstmann et al does not disclose or suggest the claimed round-robin type selection from a set of equidistant localities. Therefore, applicants respectfully submit that claim 20 is now patentably distinguished over Koenen in view of Horstmann et al.

Conclusion

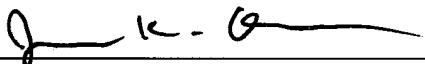
For at least the above reasons, it is believed that the pending claims are patentably distinguished over the applied references and are now in form for allowance. The Examiner is invited to telephone the undersigned at (408) 436-2111 for any questions.

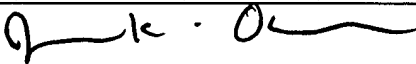
If for any reason an insufficient fee has been paid, the Commissioner is hereby authorized to charge the insufficiency to Deposit Account No. 50-2427.

Respectfully submitted,
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